

SEQUENCE LISTING

<110> CHONNAM NATIONAL UNIVERSITY et al.

<120> MUCOSAL VACCINE ADJUVANTS CONTAINING BACTERIAL FLAGELLINS AS AN ACTIVE COMPONENT

<130> Q95704

<140> US/10/585,880

<141> 2006-07-11

<150> KR 10-2004-0001974

<151> 2004-01-12

<160> 18

<170> KopatentIn 1.71

<210> 1

<211> 1131

<212> DNA

<213> *Vibrio vulnificus*

<400> 1

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gccgctgaag gtcaacaaaa atcaatggag cgtttgtctt cgggctataa aatcaatagc 120

gcgaaagatg atgctgcagg tctacaaatt tctaaccgtt tgaactcgca aagccgtggt 180

ctcgacatgg cgggttaaaaa tgccaacgat ggtatctcta ttgcacagac tgctgaaggt 240

gcaatgacag agaccaccaa catcctacaa cgtatgcgtg accttgcctt gcaatcgtct 300

aacggttcga actctcgttc tgaacgcgtg gcgattcaag aagaagtgtc agcgttgaac 360

caagaactta accgtatcgc agagacaacc tcttttgggtg gtaacaaact ccttaacggt 420

acgtacgggt ctcaatcttt ccaaatcggg gctgactctg gtgaagctgt gatgctttct 480

atgggtaacc ttcgttcaga tacagacgcg atgggagggt tgagctacaa atctgaagaa 540

ggcgtaggcg cagattggcg tgtaagcgac aacactgact tcacgatgtc ttatgtgaat 600

aagcaagggt aagaaaaaga gatcacagtc aacgccaaag cgggtgacga tcttgaagaa 660

ctggcgactt acatcaacgg tcaaaacgat gatgtgaaag cgtcggtcgg tgaaggcggc 720

aaactgcagc tattcgcttc taaccaacgt gtagaagggt aagtggaatt cgggtggtggt 780

ctagcgtctg agttgaacat tggatgagg accaaaacca atgtgagcaa cattgatgtc 840

acgacgggtg ctggctctca agaagcagta gcgatcattg atggcgcat gaaatcggt 900

gacagtgagc gtgcctctct aggtgcattc caaaaccgtt tcaaccatgc aatcagcaac 960

ctaagcaaca tcaatgagaa cgtaaaccgt tgcagcagcc gtatcaagga taccgactac 1020

gcgaaagaaa cgactcagat gactaagacg caaattctgc agcaggcgag tacttctatc 1080

ctggcgcagg cgaagcagtc accatctgca gctcttagct tgttgggcta a

1131

<210> 2
 <211> 376
 <212> PRT
 <213> Vibrio vulnificus

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 20 25 30
 Ser Ser Gly Tyr Lys Ile Asn Ser Ala Lys Asp Asp Ala Ala Gly Leu
 35 40 45
 Gln Ile Ser Asn Arg Leu Asn Ser Gln Ser Arg Gly Leu Asp Met Ala
 50 55 60
 Val Lys Asn Ala Asn Asp Gly Ile Ser Ile Ala Gln Thr Ala Glu Gly
 65 70 75 80
 Ala Met Thr Glu Thr Thr Asn Ile Leu Gln Arg Met Arg Asp Leu Ala
 85 90 95
 Leu Gln Ser Ser Asn Gly Ser Asn Ser Arg Ser Glu Arg Val Ala Ile
 100 105 110
 Gln Glu Glu Val Ser Ala Leu Asn Gln Glu Leu Asn Arg Ile Ala Glu
 115 120 125
 Thr Thr Ser Phe Gly Gly Asn Lys Leu Leu Asn Gly Thr Tyr Gly Ser
 130 135 140
 Gln Ser Phe Gln Ile Gly Ala Asp Ser Gly Glu Ala Val Met Leu Ser
 145 150 155 160
 Met Gly Asn Leu Arg Ser Asp Thr Asp Ala Met Gly Gly Leu Ser Tyr
 165 170 175
 Lys Ser Glu Glu Gly Val Gly Ala Asp Trp Arg Val Ser Asp Asn Thr
 180 185 190
 Asp Phe Thr Met Ser Tyr Val Asn Lys Gln Gly Glu Glu Lys Glu Ile
 195 200 205
 Thr Val Asn Ala Lys Ala Gly Asp Asp Leu Glu Glu Leu Ala Thr Tyr
 210 215 220
 Ile Asn Gly Gln Asn Asp Asp Val Lys Ala Ser Val Gly Glu Gly Gly
 225 230 235 240
 Lys Leu Gln Leu Phe Ala Ser Asn Gln Arg Val Glu Gly Glu Val Glu
 245 250 255
 Phe Gly Gly Gly Leu Ala Ser Glu Leu Asn Ile Gly Asp Gly Thr Lys
 260 265 270

Thr Asn Val Ser Asn Ile Asp Val Thr Thr Val Ala Gly Ser Gln Glu
 275 280 285
 Ala Val Ala Ile Ile Asp Gly Ala Leu Lys Ser Val Asp Ser Glu Arg
 290 295 300
 Ala Ser Leu Gly Ala Phe Gln Asn Arg Phe Asn His Ala Ile Ser Asn
 305 310 315 320
 Leu Ser Asn Ile Asn Glu Asn Val Asn Ala Ser Ser Ser Arg Ile Lys
 325 330 335
 Asp Thr Asp Tyr Ala Lys Glu Thr Thr Gln Met Thr Lys Thr Gln Ile
 340 345 350
 Leu Gln Gln Ala Ser Thr Ser Ile Leu Ala Gln Ala Lys Gln Ser Pro
 355 360 365
 Ser Ala Ala Leu Ser Leu Leu Gly
 370 375

<210> 3
 <211> 1133
 <212> DNA
 <213> *Vibrio vulnificus*

<400> 3
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 gcaaacagcg cacaacaaac ttcgatggag cgtctgtctt caggtttcaa aatcaacagt 120
 gcaaaagatg acgcagccgg tctgcaaata tctaaccgct tgaacgtaca aagtcgcggt 180
 ctagacgttg cggtagctaa cgccaacgac ggtatctcaa tcgcacaaac cgcagaaggt 240
 gcgatgaacg agaccaccaa catcctacaa cgtatgcgtg acctatctct acaatccgcg 300
 aacggctcaa actcaaaatc agagcgcgtg gcgattcaag aagaagtac agcattgaat 360
 gacgagctaa accgtattgc agaaaccacg tcttttgggtg gtaacaagct gctaaacggt 420
 acttacggca cgaaagcaat gcaaattggt gcggataacg gtgaagcggg catgctttca 480
 ctgaaagaca tgcgctctga caacgtgatg atgggcggcg tgagctacca agctgaagaa 540
 ggcaaagaca agaactggaa tgtggccgca ggcgacaacg acttgacgat tgcactgaca 600
 gacagctttg gtaacgagca agagatcgaa atcaacgcga aagcgggtga tgacatcgaa 660
 gagctagcga cgtacatcaa cgggtcaaact gaccttgtaa aagcgtcagt ggggtgaaggc 720
 ggcaagctac agatctttgc tggtaacaac aaagttcaag gtgaaattgc tttctcaggt 780
 agcctagctg gtgaacttgg cctaggcgaa ggcaaaaacg tcacggtaga cacgattgac 840
 gtgacaaccg tacaaggtgc gcaagagtcg gtagcgattg tggatgcggc actgaaatac 900
 gtagacagcc accgtgcaga gctgggtgca ttccagaacc gtttcaacca tgcaatcagc 960

aacttgacac acatcaacga aaacgtgaac gcgtcgaaga gccgaatcaa agataccgac 1020
 ttgcgcgaaag aaacgactca gttgaccaag acacaaaattc tatcgcaagc atcaagttcc 1080
 attcttgctgc aagcgaaaca agcgccaaac tcagcgctaa gtctactagg cta 1133

<210> 4
 <211> 375
 <212> PRT
 <213> *Vibrio vulnificus*

<400> 4
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 Tyr Leu Asn Asn Ala Asn Ser Ala Gln Gln Thr Ser Met Glu Arg Leu
 20 25 30
 Ser Ser Gly Phe Lys Ile Asn Ser Ala Lys Asp Asp Ala Ala Gly Leu
 35 40 45
 Gln Ile Ser Asn Arg Leu Asn Val Gln Ser Arg Gly Leu Asp Val Ala
 50 55 60
 Val Arg Asn Ala Asn Asp Gly Ile Ser Ile Ala Gln Thr Ala Glu Gly
 65 70 75 80
 Ala Met Asn Glu Thr Thr Asn Ile Leu Gln Arg Met Arg Asp Leu Ser
 85 90 95
 Leu Gln Ser Ala Asn Gly Ser Asn Ser Lys Ser Glu Arg Val Ala Ile
 100 105 110
 Gln Glu Glu Val Thr Ala Leu Asn Asp Glu Leu Asn Arg Ile Ala Glu
 115 120 125
 Thr Thr Ser Phe Gly Gly Asn Lys Leu Leu Asn Gly Thr Tyr Gly Thr
 130 135 140
 Lys Ala Met Gln Ile Gly Ala Asp Asn Gly Glu Ala Val Met Leu Ser
 145 150 155 160
 Leu Lys Asp Met Arg Ser Asp Asn Val Met Met Gly Gly Val Ser Tyr
 165 170 175
 Gln Ala Glu Glu Gly Lys Asp Lys Asn Trp Asn Val Ala Ala Gly Asp
 180 185 190
 Asn Asp Leu Thr Ile Ala Leu Thr Asp Ser Phe Gly Asn Glu Gln Glu
 195 200 205
 Ile Glu Ile Asn Ala Lys Ala Gly Asp Asp Ile Glu Glu Leu Ala Thr
 210 215 220
 Tyr Ile Asn Gly Gln Thr Asp Leu Val Lys Ala Ser Val Gly Glu Gly
 225 230 235 240
 Gly Lys Leu Gln Ile Phe Ala Gly Asn Asn Lys Val Gln Gly Glu Ile

	245		250		255
Ala Phe Ser Gly Ser Leu Ala Gly Glu Leu Gly Leu Gly Glu Gly Lys					
	260		265		270
Asn Val Thr Val Asp Thr Ile Asp Val Thr Thr Val Gln Gly Ala Gln					
	275		280		285
Glu Ser Val Ala Ile Val Asp Ala Ala Leu Lys Tyr Val Asp Ser His					
	290		295		300
Arg Ala Glu Leu Gly Ala Phe Gln Asn Arg Phe Asn His Ala Ile Ser					
305		310		315	320
Asn Leu Asp Asn Ile Asn Glu Asn Val Asn Ala Ser Lys Ser Arg Ile					
	325		330		335
Lys Asp Thr Asp Phe Ala Lys Glu Thr Thr Gln Leu Thr Lys Thr Gln					
	340		345		350
Ile Leu Ser Gln Ala Ser Ser Ser Ile Leu Ala Gln Ala Lys Gln Ala					
	355		360		365
Pro Asn Ser Ala Leu Ser Leu					
	370		375		

<210> 5
 <211> 1133
 <212> DNA
 <213> Vibrio vulnificus

<400> 5
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 gcaaccgaca tgctgaatca atccttggag cgtttgtctt caggaagcg tattaatagt 120
 gcaaaagacg atgcggcagg gctgcaaatt tcgaatcgtc ttcagtcgca aatgcgtggg 180
 ttagatatcg cgggtgcgaaa tgccaatgat ggcattctcca ttatgcagac tgcggaaggg 240
 gcaatgaatg aaaccactaa tattctccaa aggatgcgtg atctttcatt gcaatccgcc 300
 aatggttcca atagctatgc tgaaagaata gccttacaag aagaaatgac cgcgttaaat 360
 gacgagttga accgtatcgc agaaaccacc tcgttcggtg ggcgtaaatt gctcaatggg 420
 tcctttgggt cggctgcctt tcagataggg gcagcgtcag gtgaagcggg gcaagtgcga 480
 ctgaagtcga tgcgcagtga tggattgat atgggtgggt tcagttacat tgcaaacgga 540
 cgtgcccgtt ctgattggca agtaaaagag ggggcgaatg cgcttagcat gtcattcacg 600
 aatcgttttg gtgaaacaga aacgatccaa attaatgcga aagccggcga tgatatcgaa 660
 gagcttgca cctacattaa tggtcagact gacaaagtca cggcatcggg gaatgaagaa 720
 ggtcagctac agttgtttat ggccggcgaa gaaacctcag gaacgttatc gttttcagga 780
 gacttagcca gtgaactcgg ttgcaacta aaagggttac atgcggtgga taatatcgac 840

attactttctg tcggtggcgc tcaacaagca gtggctgtcc ttgataccgc gatgaaatac 900
 gtcgatagtc atcgtgctga gctaggggca tatcaaaacc gcttcagcca tgcgattaat 960
 aacctcgaca acatccacga aaacttggcg acatcaaaca gtcgcattca agatacagac 1020
 tatgcgaagg aaaccacgcg catgggtcaaa caacagatcc tacagcaagt cagtacttct 1080
 attttggcgc aggcgaaaaa agggccgaat ctcgcgttga ccttgctggg ata 1133

<210> 6
 <211> 375
 <212> PRT
 <213> *Vibrio vulnificus*

<400> 6
 Val Ala Ile Thr Val Asn Thr Asn Val Ala Ala Leu Val Ala Gln Arg
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 His Leu Thr Ser Ala Thr Asp Met Leu Asn Gln Ser Leu Glu Arg Leu
 20 25 30
 Ser Ser Gly Lys Arg Ile Asn Ser Ala Lys Asp Asp Ala Ala Gly Leu
 35 40 45
 Gln Ile Ser Asn Arg Leu Gln Ser Gln Met Arg Gly Leu Asp Ile Ala
 50 55 60
 Val Arg Asn Ala Asn Asp Gly Ile Ser Ile Met Gln Thr Ala Glu Gly
 65 70 75 80
 Ala Met Asn Glu Thr Thr Asn Ile Leu Gln Arg Met Arg Asp Leu Ser
 85 90 95
 Leu Gln Ser Ala Asn Gly Ser Asn Ser Tyr Ala Glu Arg Ile Ala Leu
 100 105 110
 Gln Glu Glu Met Thr Ala Leu Asn Asp Glu Leu Asn Arg Ile Ala Glu
 115 120 125
 Thr Thr Ser Phe Gly Gly Arg Lys Leu Leu Asn Gly Ser Phe Gly Ser
 130 135 140
 Ala Ala Phe Gln Ile Gly Ala Ala Ser Gly Glu Ala Val Gln Val Gln
 145 150 155 160
 Leu Lys Ser Met Arg Ser Asp Gly Ile Asp Met Gly Gly Phe Ser Tyr
 165 170 175
 Ile Ala Asn Gly Arg Ala Arg Ser Asp Trp Gln Val Lys Glu Gly Ala
 180 185 190
 Asn Ala Leu Ser Met Ser Phe Thr Asn Arg Phe Gly Glu Thr Glu Thr
 195 200 205
 Ile Gln Ile Asn Ala Lys Ala Gly Asp Asp Ile Glu Glu Leu Ala Thr
 210 215 220

Tyr Ile Asn Gly Gln Thr Asp Lys Val Thr Ala Ser Val Asn Glu Glu
 225 230 235 240
 Gly Gln Leu Gln Leu Phe Met Ala Gly Glu Glu Thr Ser Gly Thr Leu
 245 250 255
 Ser Phe Ser Gly Asp Leu Ala Ser Glu Leu Gly Leu Gln Leu Lys Gly
 260 265 270
 Tyr Asp Ala Val Asp Asn Ile Asp Ile Thr Ser Val Gly Gly Ala Gln
 275 280 285
 Gln Ala Val Ala Val Leu Asp Thr Ala Met Lys Tyr Val Asp Ser His
 290 295 300
 Arg Ala Glu Leu Gly Ala Tyr Gln Asn Arg Phe Ser His Ala Ile Asn
 305 310 315 320
 Asn Leu Asp Asn Ile His Glu Asn Leu Ala Thr Ser Asn Ser Arg Ile
 325 330 335
 Gln Asp Thr Asp Tyr Ala Lys Glu Thr Thr Arg Met Val Lys Gln Gln
 340 345 350
 Ile Leu Gln Gln Val Ser Thr Ser Ile Leu Ala Gln Ala Lys Lys Gly
 355 360 365
 Pro Asn Leu Ala Leu Thr Leu
 370 375

<210> 7
 <211> 1158
 <212> DNA
 <213> *Vibrio vulnificus*

<400> 7
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 gcgacagatg agttaaacac ctcaatggaa cgtttgtcat ctggtcataa aattaatagc 120
 gccaaagatg atgcggccgg tttgcaaatt tctaaccgct taaccgctca gtctcgtggc 180
 ctagatgtgg cgatgcgtaa tgccaacgat ggtatctcta tcgctcaaac cgccgaaggg 240
 gcgatgaatg aagcgacggc agtcttgcag cgcattgcgtg acttgctgat tcaatccgcg 300
 aacggtacta actcaacgtc tgagcgccaa gcgattcatg aagaagcgag tgctctacaa 360
 gacgaaatta accgtattgc tgaaaccaca tcgtttggtg gacgccgtct actgaatggc 420
 acctttggtg atgcagcatt ccagattggt tctaactctg gtgaagcgat gattatgggc 480
 ttaaccagca tccgtgccga tgatttccgt atgggtggca cgaccttcca gtctgaaaat 540
 ggcaaaaaca aagattggga agtgagcgcg gataacgcag agctgaacat cgtattgcc 600
 gagatgggtg aagatgaaga tggcaatggt atcgatttag aaatcaacat catggcgaaa 660
 agcggatgat atattgaaga attggcaacg tacatcaatg gtcaatcgga ctacatcaac 720

gcatcggttaa gtgaagatgg caagctgcaa atctttgttg ctcaaccaaa tgtgaaaggc 780
 gatatctcga tttcgggtag ccttgccctct gaactggggtt tgagtgcga accgattgcg 840
 acaacagtag aagatttgga tctgctgacc gtacaagggtt ctgagaacgc aattagcggtt 900
 attgacgcgg cattgaagta cgttgattca caacgtgcgg acttaggtgc aaaacagaac 960
 cgtttaagcc acagtattaa taacttggcg aacgttcaag aaaacgttga tgcacgaac 1020
 agccgtatta aagatactga ttttgcaag gaaacgacgc aaatgacgaa agcacagatt 1080
 ttgcaacagg caggtacttc tattcttgct caagcaaac aattgccaaa ctctgcaatg 1140
 tcactattgc agggctaa 1158

<210> 8
 <211> 383
 <212> PRT
 <213> *Vibrio vulnificus*

<400> 8
 Met Ala Val Thr Val Ser Thr Asn Val Ser Ala Met Thr Ala Gln Arg
 1 5 10 15
 Tyr Leu Asn Lys Ala Thr Asp Glu Leu Asn Thr Ser Met Glu Arg Leu
 20 25 30
 Ser Ser Gly His Lys Ile Asn Ser Ala Lys Asp Asp Ala Ala Gly Leu
 35 40 45
 Gln Ile Ser Asn Arg Leu Thr Ala Gln Ser Arg Gly Leu Asp Val Ala
 50 55 60
 Met Arg Asn Ala Asn Asp Gly Ile Ser Ile Ala Gln Thr Ala Glu Gly
 65 70 75 80
 Ala Met Asn Glu Ala Thr Ala Val Leu Gln Arg Met Arg Asp Leu Ser
 85 90 95
 Ile Gln Ser Ala Asn Gly Thr Asn Ser Thr Ser Glu Arg Gln Ala Ile
 100 105 110
 His Glu Glu Ala Ser Ala Leu Gln Asp Glu Ile Asn Arg Ile Ala Glu
 115 120 125
 Thr Thr Ser Phe Gly Gly Arg Arg Leu Leu Asn Gly Thr Phe Gly Asp
 130 135 140
 Ala Ala Phe Gln Ile Gly Ser Asn Ser Gly Glu Ala Met Ile Met Gly
 145 150 155 160
 Leu Thr Ser Ile Arg Ala Asp Asp Phe Arg Met Gly Gly Thr Thr Phe
 165 170 175
 Gln Ser Glu Asn Gly Lys Asn Lys Asp Trp Glu Val Ser Ala Asp Asn
 180 185 190

Ala Glu Leu Asn Ile Val Leu Pro Glu Met Gly Glu Asp Glu Asp Gly
195 200 205

Asn Val Ile Asp Leu Glu Ile Asn Ile Met Ala Lys Ser Gly Asp Asp
210 215 220

Ile Glu Glu Leu Ala Thr Tyr Ile Asn Gly Gln Ser Asp Tyr Ile Asn
225 230 235 240

Ala Ser Val Ser Glu Asp Gly Lys Leu Gln Ile Phe Val Ala Gln Pro
245 250 255

Asn Val Lys Gly Asp Ile Ser Ile Ser Gly Ser Leu Ala Ser Glu Leu
260 265 270

Gly Leu Ser Asp Glu Pro Ile Ala Thr Thr Val Gln Asp Leu Asp Leu
275 280 285

Arg Thr Val Gln Gly Ser Gln Asn Ala Ile Ser Val Ile Asp Ala Ala
290 295 300

Leu Lys Tyr Val Asp Ser Gln Arg Ala Asp Leu Gly Ala Lys Gln Asn
305 310 315 320

Arg Leu Ser His Ser Ile Asn Asn Leu Ala Asn Val Gln Glu Asn Val
325 330 335

Asp Ala Ser Asn Ser Arg Ile Lys Asp Thr Asp Phe Ala Lys Glu Thr
340 345 350

Thr Gln Met Thr Lys Ala Gln Ile Leu Gln Gln Ala Gly Thr Ser Ile
355 360 365

Leu Ala Gln Ala Lys Gln Leu Pro Asn Ser Ala Met Ser Leu Leu
370 375 380

<210> 9
<211> 1134
<212> DNA
<213> *Vibrio vulnificus*

<400> 9
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gcaaacagcg cacaacaaac ttcgatggag cgtctgtctt caggtttcaa aatcaacagt 120
gcaaaagatg acgcagccgg tctgcaaata tctaaccgct tgaacgtgca aagtcgcggt 180
ctagacgttg cggtacgtaa cgccaacgac ggtatctcaa tcgcacaaac cgcagaaggt 240
gcgatgaacg agaccaccaa catcctacaa cgtatgcgtg acctatctct gcaatcagcg 300
aacggctcaa actcaaaatc agagcgcggtg gcgattcaag aagagatcac cgcattgaac 360
gacgagctaa accgtatcgc agaaaccacg tcttttgggtg gtaacaaact gctcaacggc 420
acttacggca cgaaagcaat gcaaattggt gcgataacg gtgaagcggt catgctgtca 480

ctcaaagaca tgcgctctga caacgtgatg atgggcggcg tgagctacca agctgaagaa 540
 ggcaaagaca agaactggaa tgtggccgca ggcgacaacg acttgacgat tgcactgaca 600
 gacagctttg gtaacgagca agagatcgaa atcaacgcga aagcgggcga tgacatcgaa 660
 gagctagcga cgtacatcaa cgggtcaaact gaccttgtaa aagcgtcagt ggggtgaaggc 720
 ggcaagctac agatctttgc tggtaacaac aaagttcaag gtgaaattgc tttctcaggt 780
 agcctagctg gtgaacttgg cctaggcgaa ggcaaaaacg tcacggtaga cacgattgac 840
 gtgacaaccg tacaaggtgc gcaagagtcg gtagcgattg tggatgcggc actgaaatac 900
 gtagacagcc accgtgcaga gctgggtgca ttccagaacc gtttcaacca tgcaatcagc 960
 aacttggaca acatcaacga gaacgtgaac gcgtcgaaga gccgaatcaa agataccgac 1020
 ttgcgaaag aaacgactca gttgaccaag acacaaattc tatcgcaagc atcaagttcc 1080
 attcttgcgc aagcgaaaca agcgccaaac tcagcgctaa gtctactagg ctaa 1134

<210> 10
 <211> 377
 <212> PRT
 <213> *Vibrio vulnificus*

<400> 10
 Met Ala Val Asn Val Asn Thr Asn Val Ala Ala Met Thr Ala Gln Arg
 1 5 10 15
 Tyr Leu Asn Asn Ala Asn Ser Ala Gln Gln Thr Ser Met Glu Arg Leu
 20 25 30
 Ser Ser Gly Phe Lys Ile Asn Ser Ala Lys Asp Asp Ala Ala Gly Leu
 35 40 45
 Gln Ile Ser Asn Arg Leu Asn Val Gln Ser Arg Gly Leu Asp Val Ala
 50 55 60
 Val Arg Asn Ala Asn Asp Gly Ile Ser Ile Ala Gln Thr Ala Glu Gly
 65 70 75 80
 Ala Met Asn Glu Thr Thr Asn Ile Leu Gln Arg Met Arg Asp Leu Ser
 85 90 95
 Leu Gln Ser Ala Asn Gly Ser Asn Ser Lys Ser Glu Arg Val Ala Ile
 100 105 110
 Gln Glu Glu Ile Thr Ala Leu Asn Asp Glu Leu Asn Arg Ile Ala Glu
 115 120 125
 Thr Thr Ser Phe Gly Gly Asn Lys Leu Leu Asn Gly Thr Tyr Gly Thr
 130 135 140
 Lys Ala Met Gln Ile Gly Ala Asp Asn Gly Glu Ala Val Met Leu Ser
 145 150 155 160

Leu Lys Asp Met Arg Ser Asp Asn Val Met Met Gly Gly Val Ser Tyr
 165 170 175
 Gln Ala Glu Glu Gly Lys Asp Lys Asn Trp Asn Val Ala Ala Gly Asp
 180 185 190
 Asn Asp Leu Thr Ile Ala Leu Thr Asp Ser Phe Gly Asn Glu Gln Glu
 195 200 205
 Ile Glu Ile Asn Ala Lys Ala Gly Asp Asp Ile Glu Glu Leu Ala Thr
 210 215 220
 Tyr Ile Asn Gly Gln Thr Asp Leu Val Lys Ala Ser Val Gly Glu Gly
 225 230 235 240
 Gly Lys Leu Gln Ile Phe Ala Gly Asn Asn Lys Val Gln Gly Glu Ile
 245 250 255
 Ala Phe Ser Gly Ser Leu Ala Gly Glu Leu Gly Leu Gly Glu Gly Lys
 260 265 270
 Asn Val Thr Val Asp Thr Ile Asp Val Thr Thr Val Gln Gly Ala Gln
 275 280 285
 Glu Ser Val Ala Ile Val Asp Ala Ala Leu Lys Tyr Val Asp Ser His
 290 295 300
 Arg Ala Glu Leu Gly Ala Phe Gln Asn Arg Phe Asn His Ala Ile Ser
 305 310 315 320
 Asn Leu Asp Asn Ile Asn Glu Asn Val Asn Ala Ser Lys Ser Arg Ile
 325 330 335
 Lys Asp Thr Asp Phe Ala Lys Glu Thr Thr Gln Leu Thr Lys Thr Gln
 340 345 350
 Ile Leu Ser Gln Ala Ser Ser Ser Ile Leu Ala Gln Ala Lys Gln Ala
 355 360 365
 Pro Asn Ser Ala Leu Ser Leu Leu Gly
 370 375

<210> 11
 <211> 1127
 <212> DNA
 <213> *Vibrio vulnificus*

<400> 11
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 gcaagtcagg tagctgaaac ccaaaaaaat ctaagttccg gattccgaat taatagtgcc 120
 agcgatgatg ccgctggaat gcagatagcg aatacgcttc acgtccaaac ccgtgggtttg 180
 gatgtggcat taactaacgc tcatagtgtc tatgtctgtg cagaaacagc ggaaggggagc 240
 ttggaagagg gcagtgaaat actgcagaga ttgcgatctc tttctcttca agccgcaaac 300
 ggatcgaatt ctgatgagga tcggcaaagt ttgcagttgg aagtgggtggt attgaaagat 360

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gaagtggaaa gaatagccag gacaaccaca tttgcgggta aaaatctgtt tgatggaagt 420
tatggttcaa aaagttttca tcttggggca aattctaatt ccatttcttt gcaactcaaa 480
aacatgcgga ctcacgttcc tgagatgggc gggatatcatt accttgcctc ggagccagcg 540
gatgaggatt ggcaagttga caaggaatca aggcaactta gctttacttt tcgagatagc 600
gaaggggatg atcaatccat taagatctcg ctttaagcctg gagacagtct cgaagaagtc 660
gctacgtata tcaattcaca gcaaaatggt gtggagtcct cggtgacgga tgatcggcga 720
ttgcagtttt atgtcgctaa tcgtcacgct cctgatgggt taaatatctc aggaagcttg 780
gagggagagc tagactttga accgcaagga caagtgacgc tcgatgaact cgatatcagt 840
agtgtgggtg gtgctcaatt ggcgattgct gttgttgata ctgcaattca atatctggat 900
tctcaccgaa gtgaaatcgg cagttttcaa aatcgggtag aggggacgat ggacaatttg 960
caaagtatca atcgcaatgt cactgaatca aaagggcgaa tatgggatac cgattttgcg 1020
aaagcatcaa ccgctttagt gaagtctcag gtattgcaac aggctacctc tgccttgctg 1080
gctcaagcca agcaagcccc aggcagtgca attggattgc tatctta 1127

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<210> 12
<211> 375
<212> PRT
<213> Vibrio vulnificus

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<400> 12
Met Val Ser Leu Asn Thr Asn Val Ser Ala Met Val Ala Gln Arg His
 1          5          10          15

Leu Ser Thr Ala Ala Ser Gln Val Ala Glu Thr Gln Lys Asn Leu Ser
      20          25          30

Ser Gly Phe Arg Ile Asn Ser Ala Ser Asp Asp Ala Ala Gly Met Gln
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Ile Ala Asn Thr Leu His Val Gln Thr Arg Gly Leu Asp Val Ala Leu
      50          55          60

Thr Asn Ala His Ser Ala Tyr Ala Val Ala Glu Thr Ala Glu Gly Ala
      65          70          75          80

Leu Glu Glu Gly Ser Glu Ile Leu Gln Arg Leu Arg Ser Leu Ser Leu
      85          90          95

Gln Ala Ala Asn Gly Ser Asn Ser Asp Glu Asp Arg Gln Ser Leu Gln
      100          105          110

Leu Glu Val Val Val Leu Lys Asp Glu Val Glu Arg Ile Ala Arg Thr
      115          120          125

Thr Thr Phe Ala Gly Lys Asn Leu Phe Asp Gly Ser Tyr Gly Ser Lys
      130          135          140

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Ser Phe His Leu Gly Ala Asn Ser Asn Ser Ile Ser Leu Gln Leu Lys
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 Asn Met Arg Thr His Val Pro Glu Met Gly Gly Tyr His Tyr Leu Ala
 165 170 175
 Ser Glu Pro Ala Asp Glu Asp Trp Gln Val Asp Lys Glu Ser Arg Gln
 180 185 190
 Leu Ser Phe Thr Phe Arg Asp Ser Glu Gly Asp Asp Gln Ser Ile Lys
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 Ile Ser Leu Lys Pro Gly Asp Ser Leu Glu Glu Val Ala Thr Tyr Ile
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 Asn Ser Gln Gln Asn Val Val Glu Ser Ser Val Thr Asp Asp Arg Arg
 225 230 235 240
 Leu Gln Phe Tyr Val Ala Asn Arg His Ala Pro Asp Gly Leu Asn Ile
 245 250 255
 Ser Gly Ser Leu Glu Gly Glu Leu Asp Phe Glu Pro Gln Gly Gln Val
 260 265 270
 Thr Leu Asp Glu Leu Asp Ile Ser Ser Val Gly Gly Ala Gln Leu Ala
 275 280 285
 Ile Ala Val Val Asp Thr Ala Ile Gln Tyr Leu Asp Ser His Arg Ser
 290 295 300
 Glu Ile Gly Ser Phe Gln Asn Arg Val Glu Gly Thr Met Asp Asn Leu
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 325 330 335
 Thr Asp Phe Ala Lys Ala Ser Thr Ala Leu Val Lys Ser Gln Val Leu
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<220>
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<220>
 <223> specific primer 2

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